

### **REMARKS**

Claims 10, 43-45, 47-50, 52-56 and 58 are pending in this Application, with claims 10, 43, 56 and 58 being independent claims. Claims 10 and 56 have been amended. Claims 11, 51 and 57 have been canceled without prejudice of the subject matter therein.

Claim 10 and 56 stand objected to. The drawings stand objected to. The claims stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims of U.S. Patent Application No. 10/713,037. Claims 11, 43-45 and 50-58 stand rejected under 35 U.S.C. § 102(a) as being anticipated by UK Patent Application GB 2277651 A to Doran (hereafter "*Doran*"). Claims 43-45, 47-49 and 58 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent 5,471,333 to Taga et al. (hereafter "*Taga*"). Claims 10 and 47-49 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Doran* in view of *Taga*. Claims 10, 11 and 50-57 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Taga* in view of U.S. Patent 5,629,795 to Suzuki et al. (hereafter "*Suzuki*"). Claims 10, 11 and 50-57 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Taga* in view of *Doran*. These rejections are traversed for the reasons below.

#### **Claim Objections**

Claims 10 and 56 stand objected to for certain informalities. Claim 10 has been amended to recite "each dispersion element from the plurality of dispersion elements including at least a fiber length and a discrete dispersion compensator." Claim 56 has been amended to recite "each dispersion element from the plurality of dispersion elements including at least a fiber length and a discrete dispersion compensator."

Accordingly, the Applicants respectfully request that the objections to claims 10 and 56 be withdrawn.

#### **Drawings**

The drawings stand objected to for failing to show every feature of the invention specified in claims 11, 51 and 57. These claims have been canceled without prejudice of the

subject matter therein. Accordingly, the Applicants respectfully request that the objection to the drawings be withdrawn.

The Claims are Patentable over the references cited in the Double-Patenting Rejection

Claims 10, 43-45 and 47-50, 52-56 and 58 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims of U.S. Patent Application No. 10/713,037.

Because the double-patenting rejection relating to U.S. Patent Application No. 10/713,037 is provisional, Applicant will address this double-patenting rejection if and when this rejection ceases to be provisional.

Accordingly, Applicant respectfully requests that the Examiner withdraw the outstanding rejection of claims 10, 43-45 and 47-50, 52-56 and 58 under the judicially created doctrine of obviousness-type double patenting.

The Claims are Patentable over *Doran*

Claims 43-45, 50, 52-56 and 58 stand rejected under 35 U.S.C. § 102(a) as being anticipated by *Doran*. This rejection is traversed for the reasons below.

Independent claim 43, for example, recites a communication system comprising “a plurality of sections, each section including at least two dispersion elements that have dispersions of opposite sign.” See also independent claims 56 and 58.

*Doran* discloses a post transmission dispersion compensation system. For example, Figure 4 shows an optical fibre 2 coupled to a compensating element 5 having an optical fibre 6. This system is disclosed as a “straightforward and ‘cheap’ post propagation technique [that] may be used to enable soliton operation of already installed and unfiltered communication systems” (emphasis added) (p. 3, first paragraph). The system uses a single dispersive compensating element of opposite sign at the end of a soliton communication system to reduce temporal pulse jitter” (emphasis added) (p. 3, second paragraph). Further to Figure 4, the optical fibre 2 is the optical component being compensated by compensating element 5 – this compensation element 5 is at the end of the optical system.

Unlike independent claim 43, which recites a plurality of sections each of which has at least two dispersion elements that have dispersions of opposite sign, Figure 4 of *Doran* merely discloses a single section having at least two dispersion elements. In fact, *Doran* merely discloses only a single dispersive compensating element having an opposite sign dispersion from the rest of the optical system such as optical fibre 2.

Thus, independent claims 43, 56 and 58 are allowable over *Doran*. Similarly, their respective dependent claims are allowable for at least this reason. Applicant respectfully requests that the Examiner withdraw the outstanding rejection of claims 43-45, 50, 52-56 and 58 under 35 U.S.C. § 102(a) as being anticipated by *Doran*.

The Claims are Patentable over *Taga*

Claims 43-45, 47-49 and 58 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent 5,471,333 to *Taga*. This rejection is traversed for the reasons below.

Independent claim 43 recites a plurality of sections that permits propagation of corresponding stable or quasi-stable optical pulse having “a time-bandwidth product greater than a time-bandwidth product of an optical pulse that is Gaussian in shape.” See also independent claim 58. In fact, the present application discloses the following:

“Another highly novel feature of these solitary waves is that their pulse shape are not the hyperbolic secants of regular optical fibre solitons . . . As the dispersion variation is increased there is a transition from the uniform fibre hyperbolic secant soliton (time-bandwidth-product 0.32) to Gaussian (0.44) form, and then pulse shapes with higher still time-bandwidth-products” (emphasis added) (see page 3, line 27 to page 4, line 4).

*Taga*, however, merely discloses an optical communication system for transmitting optical pulses having a waveform that is “a  $\text{sech}^2$  waveform essential for the optical soliton transmission” (col. 4, lines 9-10). Thus, unlike independent claim 43, which recites a time-bandwidth product greater than a time-bandwidth product of an optical pulse that is Gaussian in shape, *Taga* explicitly discloses as essential optical pulses having a time-bandwidth-product (i.e., 0.32 for hyperbolic secant soliton) that is less than the time-bandwidth product of an optical pulse that is Gaussian in shape (i.e., 0.44).

Not only does *Taga* fail to inherently disclose the recitations of independent claims 43 and 58 (as asserted by the Examiner), *Taga* discloses the exact opposite. In fact, *Taga* likely teaches away from an optical pulse having a time-bandwidth product greater than a time-bandwidth product of an optical pulse that is Gaussian in shape – *Taga* discloses that an optical pulse having a hyperbolic secant waveform (i.e., a time-bandwidth product less than that for a Gaussian shaped optical pulse) is essential.

Thus, independent claims 43 and 58 are allowable over *Taga*. Similarly, their respective dependent claims are allowable for at least this reason. Applicant respectfully requests that the Examiner withdraw the outstanding rejection of claims 43-45, 47-49 and 58 under 35 U.S.C. § 102(a) as being anticipated by *Taga*.

The Claims are Patentable over *Doran* in view of *Taga*

Claims 10 and 47-49 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Doran* in view of *Taga*. This rejection is traversed for the reasons below.

As discussed above, *Doran* discloses a post transmission dispersion compensation system. This system is disclosed as a “straightforward and ‘cheap’ post propagation technique [that] may be used to enable soliton operation of already installed and unfiltered communication systems” (emphasis added) (p. 3, first paragraph). As shown in Figure 4, the optical fibre 2 is the optical component being compensated by compensating element 5 – this compensation element 5 is at the end of the optical system.

*Taga* is directed to an optical system where manufacturing deviations in optical fibers are compensated by inserting or connecting dispersion media in optical fiber or an amplifier repeater (see col. 5, line 67 to col. 6, line 4; see also, col. 6, lines 9-13). In fact, *Taga* discloses that, from the viewpoint of manufacturing deviation, it is impossible to maintain the average value of the wavelength dispersion for each fiber span in an ultra-long distance optical system (col. 2, lines 43-47). Thus, *Taga* discloses a system in place of the conventional transmission systems (see col. 2, lines 51-53).

Thus, *Taga* is not properly combinable with *Doran*: someone looking to compensate for an installed and unfiltered transmission system like that disclosed *Doran* would not look to a reference such as *Taga* which discloses a system to replace the existing transmission system. In fact, once the compensation scheme of *Doran* or *Taga* has been adopted for a given transmission

system, no reason exists for further modifying the optical system with the *Taga* or *Doran*, respectively, given the fact that *Doran* relates to compensating for an existing transmission system and *Taga* relates to replacing an existing transmission system.

Thus, claims 10 and 47-49 are allowable over *Doran* in view of *Taga*. Applicant respectfully requests that the Examiner withdraw the outstanding rejection of claims 10 and 47-49 under 35 U.S.C. § 103(a) as being unpatentable over *Doran* in view of *Taga*.

The Claims are Patentable over *Taga* in view of *Suzuki*

Claims 10, 50 and 52-56 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Taga* in view of *Suzuki*. This rejection is traversed for the reasons below.

As discussed above, *Taga* is directed to an optical system where manufacturing deviations in optical fibers are compensated by inserting or connecting dispersion media. In the *Taga* system, one set of optical fibers has a relatively larger wavelength dispersion value and another set of optical fiber has a relatively smaller wavelength dispersion value; the two sets of optical fibers are alternatively allocated (col. 4, lines 14-23). For example, as shown in Table 1 in *Taga*, the wavelength dispersion values between relatively larger values and relatively smaller values: -18.45 ps/nm, 80.85 ps/nm, -36.63 ps/nm, 155.76 ps/nm, etc. (col. 5, lines 18-40). The *Taga* system compensates for pulse compression caused by Kerr Effect (nonlinear optical effect) of the optical fiber (col. 4, lines 10-14 and 23-26).

*Suzuki* is directed to an optical system designed to “restore the timing jitter for each section of optical fiber and hence prevent the accumulation of the timing jitter” (col. 3, lines 20-28). The *Suzuki* system restores the timing jitter by using alternating fiber sections of substantially equal, opposite signed, wavelength dispersions. For example, Embodiment 1 uses a 600 m long dispersion compensating fiber having a dispersion of -60 ps/km/nm (i.e., -36 ps/nm dispersion) to cancel the positive accumulated wavelength dispersion of +36 ps/nm for a 180 km portion of optical fiber (col. 6, lines 43-48). See also Embodiment 2 using a 1.2 km dispersion compensating fiber having -60 ps/km/nm (i.e., -72 ps/km) to cancel the positive accumulated wavelength dispersion of +72 ps/nm. In fact, *Suzuki* discloses that the described embodiments cancel between 90% to 100% of the accumulated wavelength dispersion to suppress the timing jitter (col. 9, lines 42-51).

Thus, *Taga* is not properly combinable with *Suzuki*: someone looking to compensate for manufacturing deviations in optical fibers like the system disclosed *Taga* would not look to a reference such as *Suzuki* which discloses a system designed to suppress timing jitter. In fact, the relatively large differences in the alternating sections of the *Taga* system appears to be incompatible with the substantially equal alternating sections of *Suzuki*.

Thus, claims 10, 50 and 52-56 are allowable over *Taga* in view of *Suzuki*. Applicant respectfully requests that the Examiner withdraw the outstanding rejection of claims 10, 50 and 52-56 under 35 U.S.C. § 103(a) as being unpatentable over *Taga* in view of *Suzuki*.

The Claims are Patentable over *Taga* in view of *Doran*

Claims 10, 50 and 52-56 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Taga* in view of *Doran*. This rejection is traversed for the reasons below.

Just as *Taga* is not properly combinable with *Doran* as discussed above, *Doran* is not properly combinable with *Taga*: someone looking to replace an existing transmission system with the new *Taga* system would not look to the *Doran* system that compensates for an installed and unfiltered transmission system. As discussed above, once the compensation scheme of *Taga* has been adopted for a given transmission system, no reason exists for further modifying the optical system with the *Doran* given the fact that *Taga* relates to replacing an existing transmission system and *Doran* relates to compensating for an existing transmission system.

Thus, claims 10, 50, and 52-56 are allowable over *Taga* in view of *Doran*. Applicant respectfully requests that the Examiner withdraw the outstanding rejection of claims 10, 50 and 52-56 under 35 U.S.C. § 103(a) as being unpatentable over *Taga* in view of *Doran*.

### CONCLUSION

All of the stated grounds of rejection have been properly traversed or rendered moot. The Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections, and that they be withdrawn. The Applicant believes that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

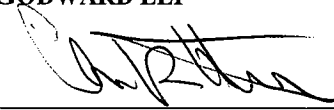
Prompt and favorable consideration of this Amendment is respectfully requested.

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Respectfully submitted,  
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